NORTH BAY AREA

SEWAGE TREATMENT PLANT

ANNUAL REPORT

1960

PREPARED BY

THE DIVISION OF PLANT OPERATIONS

ONTARIO WATER RESOURCES COMMISSION

NORTH BAY SEWAGE TREATMENT PLANT

Design Data

Design Population	50,000 Persons
Per Capita Flow	80 Imperial Gallons Per Day
Design Plant Flow	4,000,000 Gallons Per Day

The average daily flow that was recorded at the plant from November 13th to December 31st, 1961 was 4.2 million gallons. The maximum daily flow that was recorded during this period was 5.8 million gallons while the minimum daily flow was 3.4 million gallons..

Activated Sludge Treatment Process

The removal of suspended and dissolved particles and bacteria from the raw sewage is the main function of the treatment process. This produces a clean, sparkling effluent that is discharged to the water course.

The activated sludge process makes use of biological communities called sludge flocs where large numbers of living organisms grow. These flocs are the food centres of the organisms which require oxygen to maintain their development.

The flocs are produced by returning settled sludge from the final or secondary clarifier, referred to as activated sludge, and mixing it with the settled liquid sewage flowing from the primary clarifier.

The mixing of this liquor is done in the aeration tanks where air is used to agitate and activate the mixed liquor. This supplies oxygen to the activated sludge, prevents settling of the solids and generally provides ideal growing conditions for the floc. During the retention period in the secondary clarifier the finely divided suspended, and dissolved materials are transferred to the sludge.

Description of Operation

Collecting System

The sewage reaching the treatment plant is collected from three municipalities, the City of North Bay, Township of Widdifield, and Township of West Ferris. The sewage from West Ferris is pumped through a series of four pumping stations, through a measuring unit, (parshall flume), and to the treatment plant. The sewage from Widdifield enters into the North Bay sewers through two parshall flumes located at Norwood and O'Brian Avenue and together with the North Bay flow reaches the treatment plant by gravity.

Influent Works

The sewage flows into the plant entering two grit chambers. These grit chambers have a short retention period to allow the grit and sand to settle out without interferring with the organic material.

Primary Settling

From the wet well the raw sewage is pumped into the three primary clarifiers where the sewage is retained for approximately 1½ hours. The solids are collected in hoppers within the tank and pumped to the sludge thickening pit. The scum is removed from the surface of the tank and conveyed to the digesters.

The settled sewage flows over the effluent weirs to the aeration tanks.

Raw Sludge Thickening Pit

The sludge from the primary clarifiers is pumped into this pit where excess water is removed before it is pumped to the digesters.

Aeration

The settled sewage from the primary clarifiers enters the aeration tanks where, with activated sludge returned from the final clarifiers, the mixed liquor is aerated for approximately six hours.

The flow passes from here to the final or secondary clarifiers.

Final or Secondary Settling

From the aeration tanks, the mixed liquor passes into the final stage of the process, going through another settling period of approximately 2-2½ hours. It is from the activated sludge settling to the bottom of these tanks, pumped back to the aeration tanks, that a continuous environment is provided for the maintenance of the floc.

Chlorination

A separate tank is provided where chlorine is added to the effluent to ensure disinfection before discharge into Lake Nippissing.

Digestion

The digestion in this plant is carried out in two stages called primary and secondary digestion.

The raw sludge from the raw sludge pit and excess activated sludge from the final clarifiers is pumped to the primary digester. In the absence of air and at a regulated temperature of 90 degrees F. the decomposition or digestion process begins. Constant agitation within the tank ensures overall treatment.

The secondary digester receives the digested material from the primary and completes the process. This digester is not agitated and the supernatant or liquid portion is decanted and returned to the treatment process.

Manufactured Gas

During the digestion process, methane gas is formed. This gas is used to heat the buildings and digesters and as fuel for the four gas

driven engines. The standby fuel is natural gas.

Operating Difficulties

The sewage treatment plant was put into operation on September 12, 1960. Most difficulties that have been encountered could be attributed to the equipment. Some time is required to get the mechanical equipment adjusted to its intended operation.

The sewage that was received at the plant has been quite septic at times. Septic sewage is considerably more difficult to treat and has an odour when it gets to the plant. If this condition is not rectified by spring an investigation should be instigated into the causes.

The automatic pump controls for the West Ferris wet well have also caused considerable trouble. Grease has collected on the float making it difficult to rise and fall with the sewage level, consequently, the pumps would not operate as intended. Remedial measures are presently under way.

The foam control system has not operated properly. Sewage effluent is used to break the foam caused by detergents in the aeration tanks. Because of the small openings in the nozzles, particles of any size would block the spray openings. Screening of the effluent before it is used in the spray system is being incorporated in the plant.

Difficulty has been encountered in the handling of grit. This should be improved as soon as the grit handling equipment is installed.

The collecting mechanism in the secondary clarifiers has been a continuous headache. The collecting arms in the tank move the sludge to a central pit from where the sludge is pumped to the aeration tanks. This scraper mechanism was bending causing the shear pins to fail. The

one tank has been corrected while the other is still causing difficulty.

Numerous small difficulties are encountered as would be expected in a plant of this size.

Personnel

Stanley Healey is the Superintendent at North Bay. Formerly a plant operator at the Etobicoke Water Works and later Superintendent of the Etobicoke Sewage Treatment Plant, he joined the Commission staff in July, 1960, and moved to North Bay with his family.

Roland Lepage is an operator. A native of North Bay, he joined the Commission staff in August. He had been a machine operator at Bomarc.

Arthur Gauthier is the plant electrician. He joined the Commission staff last August. His former occupation was in electrical maintenance with the C.P.R.

Glen Smith is an operator, and joined the Commission staff in August. He formerly was in business for himself as a journeyman plasterer.

Stanley Toye joined the Commission staff as an operator in August. He had been a millwright and a power house operator.

William Sutherland is the plant mechanic. He joined the Commission last September. He formerly was a gas and diesel mechanic with International Harvester.

Gino Gerbasi is an operator. Formerly a machinists' helper in North Bay. He joined the Commission staff in August, 1960.

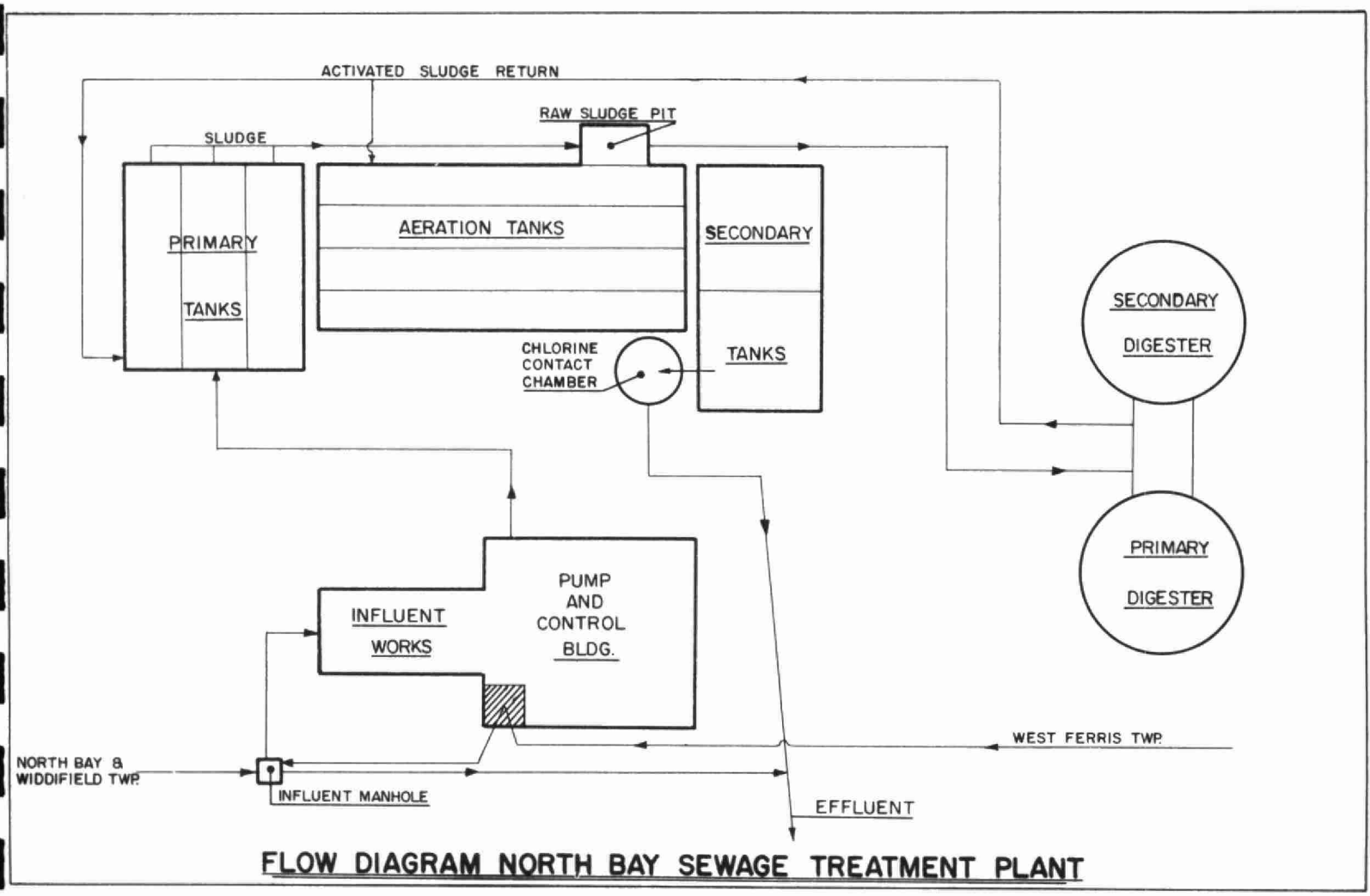
Operating Cost

The operating cost of the project during the last five months of the year was $16,749.22. Since November 13, 1960, 205.241 million gallons of sewage were treated. The operating cost of the plant during November and December was $10,225.49. The cost per 1,000 gallons is

approximately 0.05 cents. It should be remembered that this cost is based on a two month period. A greater period would be more indicative of a true figure.

Estimated Cost For 1961		
Payroll	22,655	
Fuel	1,400	
Power	6,000	
Chemicals	1,000	
General Supplies	700	
Equipment	500	
M. & R.	1,500	
Miscellaneous	3,000	
Grit & Sludge Removal	10,000	
	$46,755	
Contingency	$ 4,675	
	$51,430	say $51,000

$1,800 for insurance included on 2nd quarter miscellaneous.



FLOW DIAGRAM NORTH BAY SEWAGE TREATMENT PLANT